Sepsis Biomarkers in Burns Patients: New Test

A test that uses three biomarkers of neutrophil function on the day of a major burns injury to determine which patients are likely to become septic showed a 98.6 percent certainty.

The data highlight burn-induced neutrophil dysfunction and immature granulocyte (IG) release as a potential therapeutic target to reduce susceptibility to bacterial infections and sepsis as well a possible diagnostic marker for sepsis. The findings are published in the Annals of Surgery.

Prof. Janet Lord, Director, Institute of Inflammation and Ageing, University of Birmingham, who jointly led the research, said that the identification of novel, accurate biomarkers for sepsis is crucial to enable prompt treatment. She noted that the administration of antibiotics within three hours after sepsis recognition is recommended, but only when positive blood cultures are present, and most clinical studies show negative cultures in as many as 40 percent of severe sepsis patients.

The Birmingham research team studied neutrophil function and the production of neutrophil extracellular traps (NETs) as potential biomarkers of sepsis.

Neutrophils are protective against rapidly dividing bacterial and fungal infections, which are common in burn-injured patients. Their antimicrobial functions include phagocytosis, the generation of toxic intracellular intermediates, and the ability to produce NETs.

See Also: Biomarker Guided Antibiotic Therapy: What's New?

The study included 63 patients, who were admitted to the Queen Elizabeth Hospital Birmingham Burns Centre within 24 hours of the injury, with 39 percent burns on average.

Peripheral blood neutrophil function and biomarkers of NET production were measured and the patients were monitored for sepsis.

Three potentially novel biomarkers of sepsis in burn injury were tracked - immature granulocyte (IG) count, neutrophil phagocytosis and plasma cell free DNA – with the combination of measurements displaying good discriminatory power to predict later development of sepsis, especially at one day after injury.

Professor Lord said that their data shows that IG count could accurately distinguish between septic and non-septic patients, even allowing for the complications that systemic inflammatory response syndrome has caused for other possible biomarkers. She added that combining two or more of the biomarkers further increased their discriminatory power.

Next Steps

A trial is planned to see if using the new test will help reduce the incidence of sepsis by enabling prompt antibiotic treatment for patients identified as at risk for sepsis.

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Published on : Tue, 12 Jul 2016